Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A slab waveguide comprising a two-dimensional crystal grating having columnar members having a refractive index different from the refractive index of a slab and two-dimensionally and periodically arranged along a surface of the slab,

wherein the refractive index of a slab refractive index portion other than said columnar members in the slab, the number, the shape and the refractive index of said columnar members in the slab are selected so that when a beam of light entering the slab waveguide and traveling periodically, said columnar members and said slab refractive index portion other than said columnar members expands to a maximum extent, the size of the beam in the slab thickness direction does not exceed the slab thickness,

wherein the refractive index of said slab refractive index portion in a direction perpendicular to the slab surface is maximized at a predetermined portion other than end portions in the slab refractive index portion, and is not increased with the increase in distance from the predetermined portion, and

wherein the refractive index of said slab refractive index portion in the direction perpendicular to the slab surface is distributed symmetrically about the predetermined portion.

2.-3. (Cancelled).

4. (Original) The slab waveguide according to claim 3, wherein the refractive index of said slab refractive index portion in the direction perpendicular to the slab surface is reduced in accordance with a quadratic function or a approximately quadratic function of the distance from the predetermined portion.

5. (Original) The slab waveguide according to claim 3, wherein the predetermined portion is a region of a predetermined length other than the end portions in said slab refractive index portion, and the refractive index of said slab refractive index portion in the direction perpendicular to the slab surface is substantially constant in the region having the predetermined length other than the end portions in said slab refractive index portion and is reduced in accordance with a quadratic function or a approximately quadratic function of the distance from an end of the region having the predetermined length.

6. (Previously Presented) The slab waveguide according to claim 4 or 5, wherein a refractive index distribution constant relating to the refractive index of the portion in which the refractive index is reduced in accordance with the quadratic function or the approximately quadratic function of the distance is about 1 mm^{-1} or greater.

7. (Previously Presented) The slab waveguide according to claim 4 or 5, wherein a refractive index distribution constant relating to the refractive index of the portion in which the refractive index is reduced in accordance with the quadratic function or the approximately quadratic function of the distance is such a value that the total optical path length is defined by an optical integer multiple pitch of about 0.5.

8. (Original) The slab waveguide according to claim 4 or 5, wherein a refractive index distribution constant relating to the refractive index of the portion in which the refractive index is reduced in accordance with the quadratic function or the approximately quadratic function of the distance is such a value that the sum of an incidence-side focal distance and an emergence-side focal distance of said slab refractive index portion is equal to the length of a constituent unit formed by said slab refractive index portion and said columnar members.

9. (Original) The slab waveguide according to claim 1, wherein at least one of boundary surfaces between said slab refractive index portion and said columnar members has a curved surface.

10. (Currently Amended) ~~The slab waveguide according to claim 9,~~ A slab waveguide comprising a two-dimensional crystal grating having columnar members having a refractive index different from the refractive index of a slab and two-dimensionally and periodically arranged along a surface of the slab,

wherein the refractive index of a slab refractive index portion other than said columnar members in the slab, the number, the shape and the refractive index of said columnar members in the slab are selected so that when a beam of light entering the slab waveguide expands to a maximum extent, the size of the beam in the slab thickness direction does not exceed the slab thickness,

wherein at least one of boundary surfaces between said slab refractive index portion and said columnar members has a curved surface, and

wherein the boundary surface between said slab refractive index portion and said columnar members has a curved surface in the thickness direction of the slab.

11. (Original) The slab waveguide according to claim 9, wherein the boundary surface between said slab refractive index portion and said columnar members has a flat surface in a region having a predetermined length other than end portions in said slab refractive index portion, and has curved surfaces in the slab thickness direction of the slab outside the region having a predetermined length.

12. (Original) The slab waveguide according to claim 10 or 11, wherein the radius of curvature of the curved surface is such a value that the sum of an incidence-side focal distance and an emergence-side focal distance of said slab refractive index portion is equal to the length of a constituent unit formed by said slab refractive index portion and said columnar members.

13. (Original) The slab waveguide according to claim 12, wherein the radius of curvature of the curved surface is such a value that the sum of an incidence-side focal distance and an emergence-side focal distance of said slab refractive index portion are equal to each other.

14. (Previously Presented) The slab waveguide according to claim 10 or 11, wherein the radius of curvature of the curved surface is about 0.1 μm or greater.

15. (Withdrawn) A method of manufacturing a slab waveguide, comprising

a lamination step of forming a laminate by laminating a plurality of films differing in refractive index from each other and each having holes formed therein, while aligning the holes of the films,

wherein a film portion of the laminate functions as a slab, and each of portions corresponding to the holes in the films functions as a columnar member.

16. (Withdrawn) The method of manufacturing a slab waveguide according to claim 15, wherein one of the films having the highest refractive index is placed at a position other than end portions of the laminate, and the other films are successively laminated outwardly from the position of the film having the highest refractive index in decreasing order of refractive index.

17. (Withdrawn) The method of manufacturing a slab waveguide according to claim 15, wherein said lamination step includes irradiating a surface of each of the plurality of films with single-wavelength light applied perpendicular to the surface of the film when the film is laminated on the laminate, and aligning the position of the holes of the films in the film thickness direction by positioning the laminated film on the basis of interference light from the laminate.

18. (Withdrawn) A method of manufacturing a slab waveguide, comprising:

a lamination step of forming a laminate by laminating a plurality of films differing in refractive index from each other; and

a columnar member forming step of forming holes in the laminate formed in said lamination step,

wherein a film portion of the laminate functions as a slab, and each of portions corresponding to the holes in the films functions as a columnar member.

19. (Withdrawn) The method of manufacturing a slab waveguide according to claim 18, wherein said lamination step includes:

a thick film laminate forming step of forming a refractive index distributed thick film laminate by laminating thick films differing in refractive index from each other in such a manner that the refractive index is maximized in a portion other than end portions of the laminate; and

a pressing step of pressing the refractive index distributed thick film laminate in the direction of lamination until the thickness of the refractive index distributed thick film laminate becomes equal to a desired thickness.

20. (Withdrawn) The method of manufacturing a slab waveguide according to claim 19, wherein, in said pressing step, the refractive index distributed thick film laminate is weighted down by being pinched between two members having surfaces which are not parallel to each other at least in a restricted region.

21. (Withdrawn) The method of manufacturing a slab waveguide according to claim 20, wherein said two members comprise a first member having a horizontal flat surface, and a second member having a flat surface or a curved surface such that the distance from the flat surface of the first member changes monotonously with respect to a direction parallel to the flat surface of the first member.

22. (Withdrawn) A method of manufacturing a slab waveguide, comprising:

a refractive index distribution forming step of forming a refractive index distribution in a film-like slab blank by causing ions to move into and out of the film-like slab blank through upper and lower surfaces of the film-like slab blank; and

a columnar member forming step of forming holes in the film-like slab blank in which the refractive index distribution is formed,

wherein a portion of the film-like slab blank functions as a slab, and each of portions corresponding to the holes functions as a columnar member.